

AMENDMENTS TO THE CLAIMS

This listing of claims supersedes all prior versions and listings of claims in this application:

LISTING OF CLAIMS:

1. (currently amended): A cleaning and releasing device for spraying a jet flow onto an object to be cleaned, comprising:

an injection nozzle for mixing and then injecting a pressurized liquid and a pressurized gas;

a pressurized liquid flow passage for supplying the pressurized liquid to said injection nozzle;

a pressurized gas flow passage for supplying the pressurized gas to said injection nozzle;

operating means for supplying and stopping the pressurized liquid to said injection nozzle, said operating means being provided in said injection nozzle or on the flow passage of the pressurized liquid in communication ~~therewith~~ with said injection nozzle;

detecting means for detecting supply and stop of the pressurized liquid generated by an operation of said operating means, said detecting means being provided in a position on said pressurized liquid flow passage;

a switching valve provided in the flow passage of the pressurized gas and serving to supply and stop the pressurized gas to said injection nozzle; and

a controller for controlling a switching operation of said switching valve based on a detection signal transmitted from the detecting means;

wherein the controller opens said switching valve based on a detection signal transmitted from the detecting means so as to supply the pressurized gas to said injection nozzle when the injection of the pressurized liquid from said injection nozzle is detected by said detecting means;
and

wherein the controller closes said switching valve based on a detection signal transmitted from the detecting means so as to stop the supply of the pressurized gas to said injection nozzle when the stop of the injection of the pressurized liquid from said injection nozzle is detected by said detecting means.

2. (cancelled)

3. (previously presented): A cleaning and releasing device according to claim 1, further comprising powder and granular supply means being provided on a flow passage of the pressurized gas, and supply and stop of the powder and granular material is controlled based on a result of the detection related to the supply and stop of the pressurized liquid to said injection nozzle.

4. (previously presented): A cleaning and releasing device according to claim 3, wherein the supply of the pressurized gas is started and the supply of the powder and granular material is started based on the detection of the supply of the pressurized liquid to said injection nozzle when injection is to be started, the supply of the powder and granular material is stopped and the supply of the pressurized gas is stopped after a predetermined time passes based on the detection of the stop of the pressurized liquid to said injection nozzle when the injection is to be stopped.

5. (currently amended): A cleaning and releasing device for sucking a gas through a jet flow of a pressurized liquid supplied to an injection nozzle and for spraying a gas-liquid mixed jet flow formed by supplying a powder and granular material onto an object to be cleaned, said device comprising:

- a liquid tank for storing liquid;
- a pump for pressurizing the liquid in said liquid tank to supply pressurized liquid;
- a liquid supply passage for connecting said liquid tank to said pump;
- a pressurized liquid flow passage for connecting said pump to said injection nozzle;
- a powder and granular material tank for storing said powder and granular material;
- a sucked gas supply passage for connecting said powder and granular material tank to said injection nozzle;
- powder and granular supply means for supplying a powder and granular material stored in said powder and granular material tank to said sucked gas supply passage;

operating means for operating supply and stop of the pressurized liquid, said operating means being provided in said injection nozzle or in communication therewith;

detecting means for detecting the supply and stop of the pressurized liquid generated by an operation of said operating means, said detecting means being provided in a position on a flow passage of the pressurized liquid; and

~~a relief valve for returning an extra liquid into said liquid tank to hold a predetermined pressure of a downstream side of said pump;~~

~~a return pipe for connecting said relief valve and said liquid tank;~~

~~powder and granular supply means for supplying a powder and granular material; and~~

a controller for controlling ~~a switching operation of said switching valve~~ the powder and granular supply means based on a detection signal transmitted from the detecting means;

wherein the controller controls said powder and granular supply means so as to supply said powder and granular to said injection nozzle when said detecting means detects the supply of the pressurized liquid to said injection nozzle; and

wherein the controller stops an operation of said powder and granular supply means so as to stop the supply of said powder and granular material to said sucked gas supply passage when the stop of the supply of the pressurized liquid is detected by said detecting means.

6. (currently amended): A cleaning and releasing device comprising:

a liquid tank for storing liquid;

a pump for pressurizing the liquid in said liquid tank to supply pressurized liquid;

a liquid supply passage for connecting said liquid tank to said pump;
an injection nozzle for injecting the pressurized liquid;
a pressurized liquid flow passage for connecting said pump to said injection nozzle;
a pressurized gas source;
a pressurized gas supply passage for connecting said pressurized gas source to said injection nozzle;
a switching valve provided on said pressurized gas supply passage;
a sensor provided on ~~one of said liquid supply passage and~~ said pressurized liquid flow passage to detect supply and stop of the pressurized liquid from said liquid tank;
an operating portion disposed in said injection nozzle or on said pressurized liquid flow passage to thereby supply and stop the pressurized liquid; and
a controller connected to said sensor and said pressurized gas supply passage, said controller detecting supply and stop of the pressurized liquid detected by said sensor to thereby control supply and stop of the pressurized gas from said pressurized gas supply passage to said injection nozzle based on a ~~result of a detection by~~ said sensor;
wherein pressurized gas is supplied to said injection nozzle from said pressurized gas supply passage when said sensor detects the supply of the pressurized liquid from said liquid tank.

7. (previously presented): A cleaning and releasing device according to claim 6, further comprising a powder and granular material tank connected to said pressurized gas supply

passage, and supply and stop of powder and granular material is controlled by said controller based on the supply and stop of the pressurized liquid detected by said sensor.

8. (withdrawn): A cleaning and releasing device comprising:

- a liquid tank for storing liquid;
- a pump for pressurizing the liquid in said liquid tank to supply pressurized liquid;
- a liquid supply passage for connecting said liquid tank to said pump; an injection nozzle for injecting the pressurized liquid;
- a pressurized liquid flow passage for connecting said pump to said injection nozzle;
- an air supply passage connected to said injection nozzle, said air supply passage sucking air from outside based on an ejector effect of a jet flow of the pressurized liquid;
- a sensor provided on one of said liquid supply passage and said pressurized liquid flow passage to detect supply and stop of the pressurized liquid from said liquid tank;
- a powder and granular material tank connected to said air supply passage and supplying powder and granular material;
- an operating portion disposed in said injection nozzle or in the vicinity thereof on said pressurized liquid flow passage to thereby supply and stop the pressurized liquid; and
- a controller connected to said sensor and said pressurized gas supply passage, said controller detecting supply and stop of the pressurized liquid detected by said sensor to thereby control supply and stop of the powder and granular material from said powder and granular material tank to air supply passage based on a result of a detection by said sensor.

9-13. (cancelled).

Please add the following new claims 14 and 15:

14. (new): A cleaning and releasing device according to claim 6, wherein the controller controls the supply and stop of the pressurized gas by opening and closing a switching valve on the pressurized gas supply passage.

15. (new): A cleaning and releasing device according to claim 7, wherein the controller controls the supply and stop of powder and granular material by stopping and starting operation of a drive motor connected to the powder and granular material tank.